



May 13, 2025 Mitsui Chemicals, Inc. Hagihara Industries Inc.

# <u>Mitsui Chemicals, Hagihara Industries Jointly Develop</u> <u>Technology for Homogenizing Viscosity of Heterogeneous</u> <u>Recycled Plastics</u>

Mitsui Chemicals, Inc. (Tokyo: 4183; President & CEO: HASHIMOTO Osamu) and Hagihara Industries Inc. (Tokyo: 7856; President: ASANO Kazushi) today announced that they have carried out joint development for technology to homogenize the viscosity of recycled plastics, resulting in the successful demonstration of this technology.

## Background to the joint development

Due to inconsistent quality among plastic waste, recycled plastics made using that waste can exhibit heterogeneous viscosity, leading to issues such as lower yields and an inability to use the recycled plastics outside of low-quality applications. In an effort to resolve these issues, Hagihara Industries and Mitsui Chemicals decided to take in-line viscosity measurement technology jointly developed by Mitsui Chemicals and the Nagaoka University of Technology and fit it to recycled pellet extruders to pursue the joint development of technology for homogenizing viscosity.

Mitsui Chemicals is aiming to achieve ongoing growth driven by solutions to social issues – and with this goal in mind, the company is working to make both society and the environment more sustainable via a transition to a circular economy. These efforts have previously seen Mitsui Chemicals work with the Nagaoka University of Technology on developing viscosity homogenization technology that leverages tandem extrusion to control viscosity in recycled plastic, with the aid of in-line viscometers capable of measuring plastic waste viscosity in real time.

Meanwhile, Japan's largest manufacturer of blue tarps, Hagihara Industries is aiming to help bring about a sustainable society. As part of this pursuit, 2021 saw the company launch a Japan-first project called ReVALUE+<sup>™</sup>, which uses discarded blue tarps as a raw material to produce new blue tarps through horizontal recycling. However, the fact that discarded tarps are mixed with contaminants and other companies' products upon recovery has caused issues with the quality of the recycled goods, requiring limits on the proportion of recycled material used in horizontally recycled products.

Hagihara Industries is therefore aiming to improve the quality of recycled materials, which would in turn allow it to further increase the proportion of these materials in its products. To achieve this, the company is leveraging its production technology for industrial machinery to develop advanced cleaning technology and equipment, as well

as granulation equipment with highly effective contaminant removal (i.e. advanced filtration) and technology for refining and improving resin viscosity.

Now, Mitsui Chemicals and Hagihara Industries have further developed this technology to create a method wherein viscosity can be homogenized using only a single extruder. The companies hope that this will lead to the popularization of high-quality material recycling and, in turn, progress toward a circular economy.

## Details of the technology demonstration

Mitsui Chemicals' in-line viscometer and viscosity homogenization technology control theory were incorporated into Hagihara Industries' recycled pellet extruder for demonstration testing, which showed it was possible to keep viscosity at a target value. This technology would make it possible to homogenize the viscosity of recycled plastic while maintaining the proportion of plastic waste used to create it, helping in turn to improve yield and product quality alike.



Image: Method for adjusting viscosity of plastic waste (Left: Tandem method. Right: Single-extruder method)

Further details on this announcement will be presented at a May 15 conference as part of Highly-Functional Material Week OSAKA (<u>https://www.material-expo.jp/osaka/en-gb.html#/</u>), an event to be held over May 14–16, 2025.

#### **References:**

- September 9, 2020
  Mitsui Chemicals Launches Joint Research with Nagaoka University of Technology to Propel Plastic Waste Recycling
   https://jp.mitsuichemicals.com/en/release/2020/2020\_0915/index.htm
- December 12, 2024
  Mitsui Chemicals Collaborates on Technology Trial for Recovered Material Sorting to Improve ReVALUE+<sup>™</sup> Horizontal Recycling Project for Blue Tarpaulin Sheets <u>https://jp.mitsuichemicals.com/en/release/2024/2024\_1212/index.htm</u>

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